Emerging Compounds Update
GenX – Chemours
Air Quality Committee

July 2018

Division of Air Quality

Department of Environmental Quality

Emerging Compounds

What is GenX?

- **C3 Dimer Acid, $C_6HF_{11}O_3$**
- **GenX is a trade name for a man-made and unregulated chemical used in manufacturing nonstick coatings and for other purposes.**

- **Chemours' facility (formerly DuPont) near Fayetteville began producing GenX commercially in 2009 as a replacement for Perfluorooctanoic acid (PFOA).**

- **The same chemical is also produced as an intermediary during other manufacturing processes at Chemours and it may have been present in the environment for many years before being produced commercially as GenX.**

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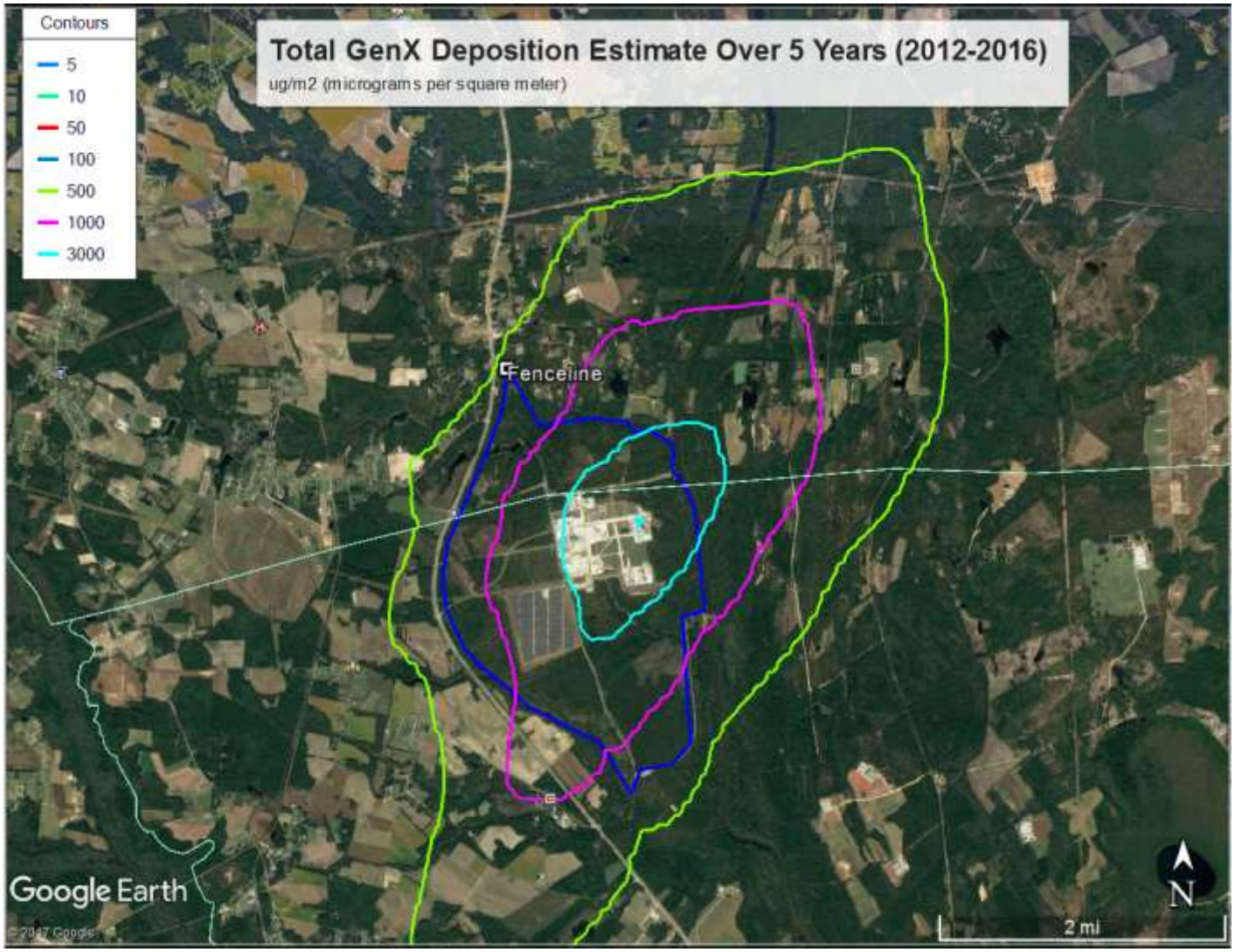
Emerging Compounds



Air Emissions Testing or "Stack Testing"

- Target compound – C_3 Dimer Acid (GenX)

- Week of:
  - January 8 – PPA & Vinyl Ethers (VE) North
  - January 22 - PPA & VE North
  - February 26 - PPA & VE South
  - March 19 - VE North, Polymers, Semiworks
  - April 3 – VE South & VE North for HFPO
  - April 23 – VE North HFPO
  - May 14 – Polymers for E1
  - June 11 – PPA & VE North Carbon bed

- Future testing:
  - July 16 – PPA scrubber efficiency
    - VE North carbon bed & Scrubber
  - July 23 – PPA scrubber &
    - carbon bed efficiency

Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

- **GenX emissions data**
  - Started with only estimates
  - Required stack tests
  - Method development
  - First of its kind measurements

Chemours 2016 emissions estimates as originally reported to DAQ	Chemours revised 2016 emissions estimates as of October 2017	Latest calculations, including January through April 2018 stack test measurements
66.6 lb/yr	594 lb/yr	2758 lb/yr

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Angry, frustrated crowd of 350 demands GenX answers

Public outcry at GenX info session: 'Enough is enough'

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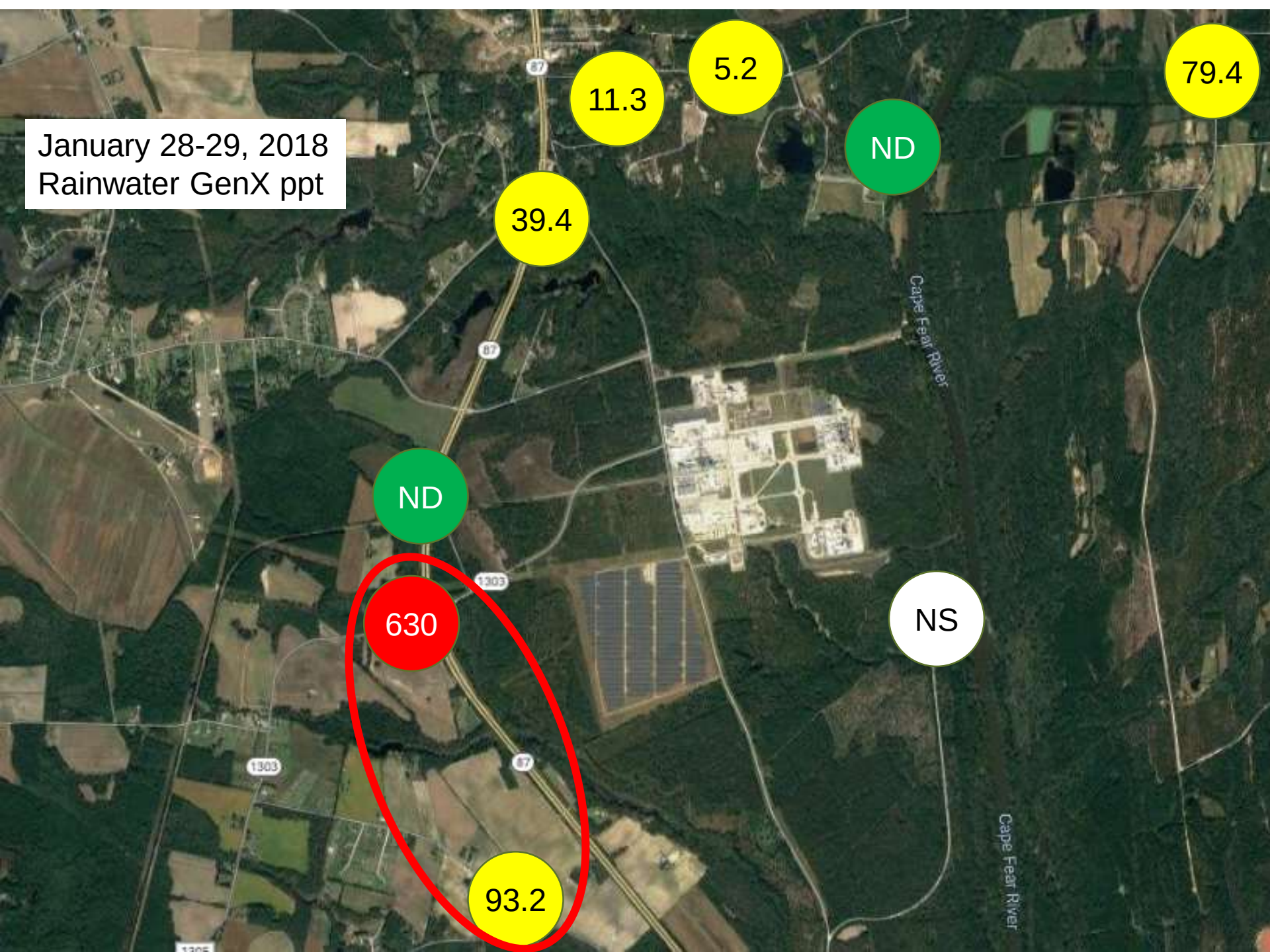
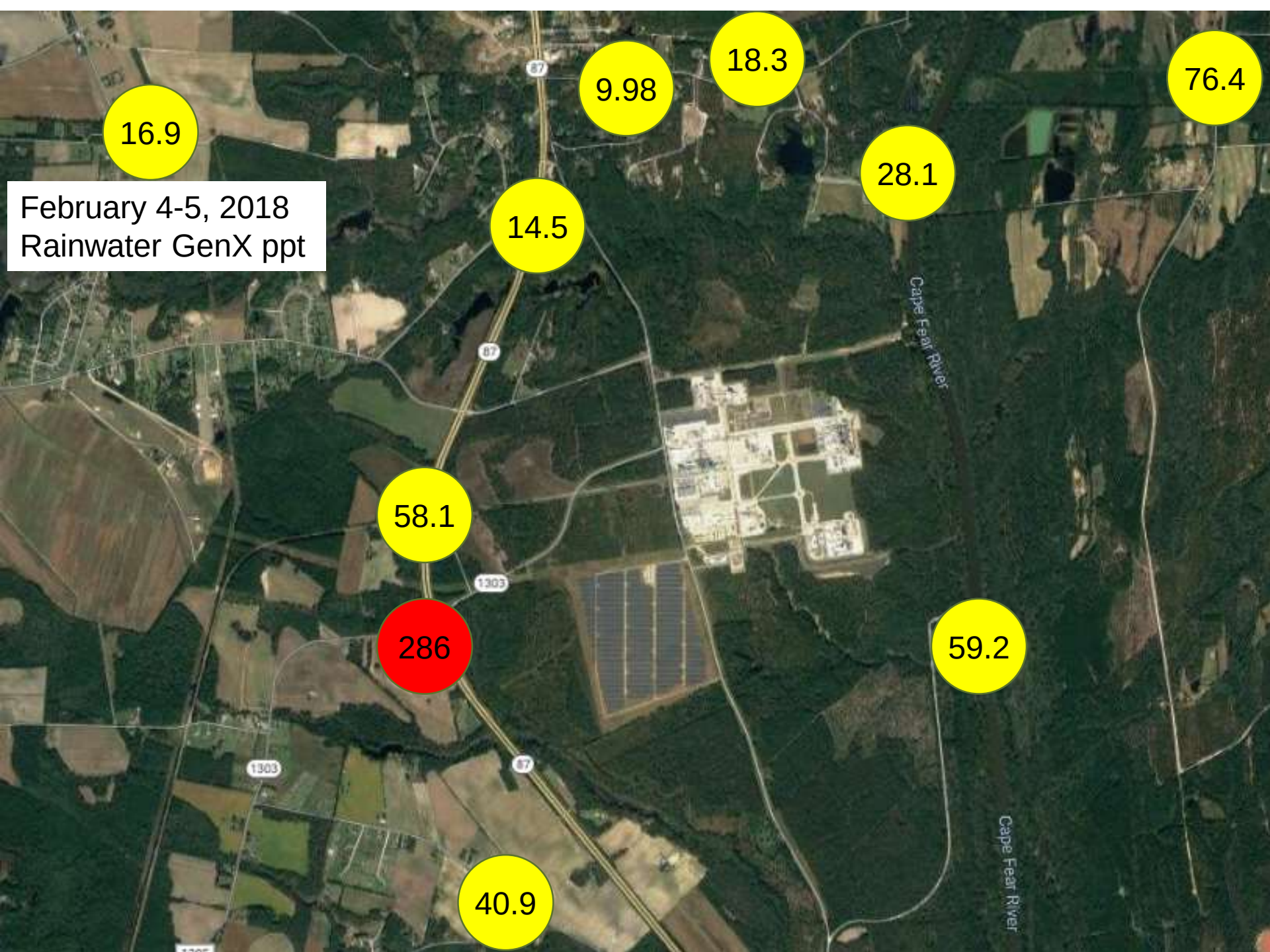
Atmospheric Deposition

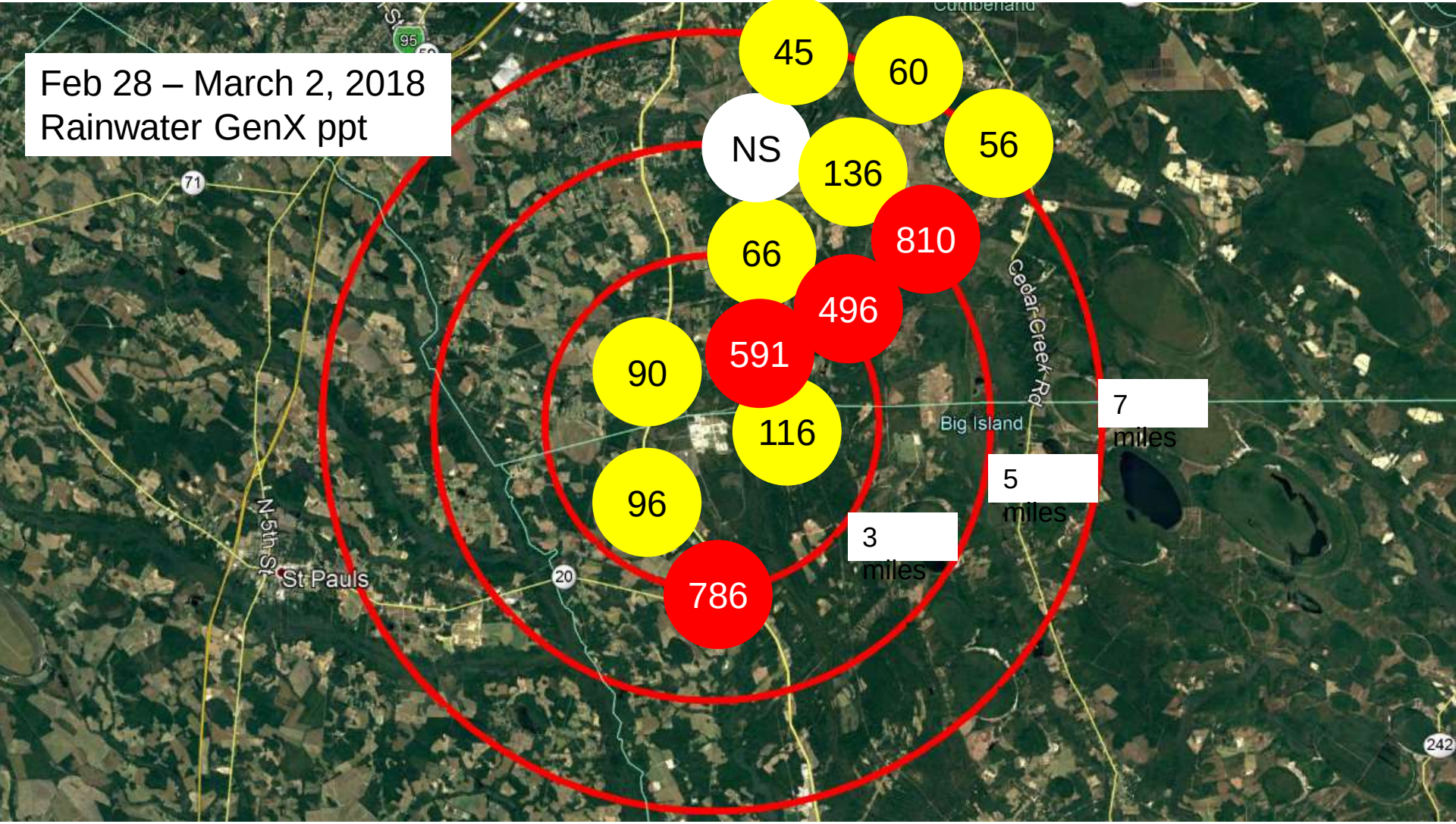
Needed information immediately

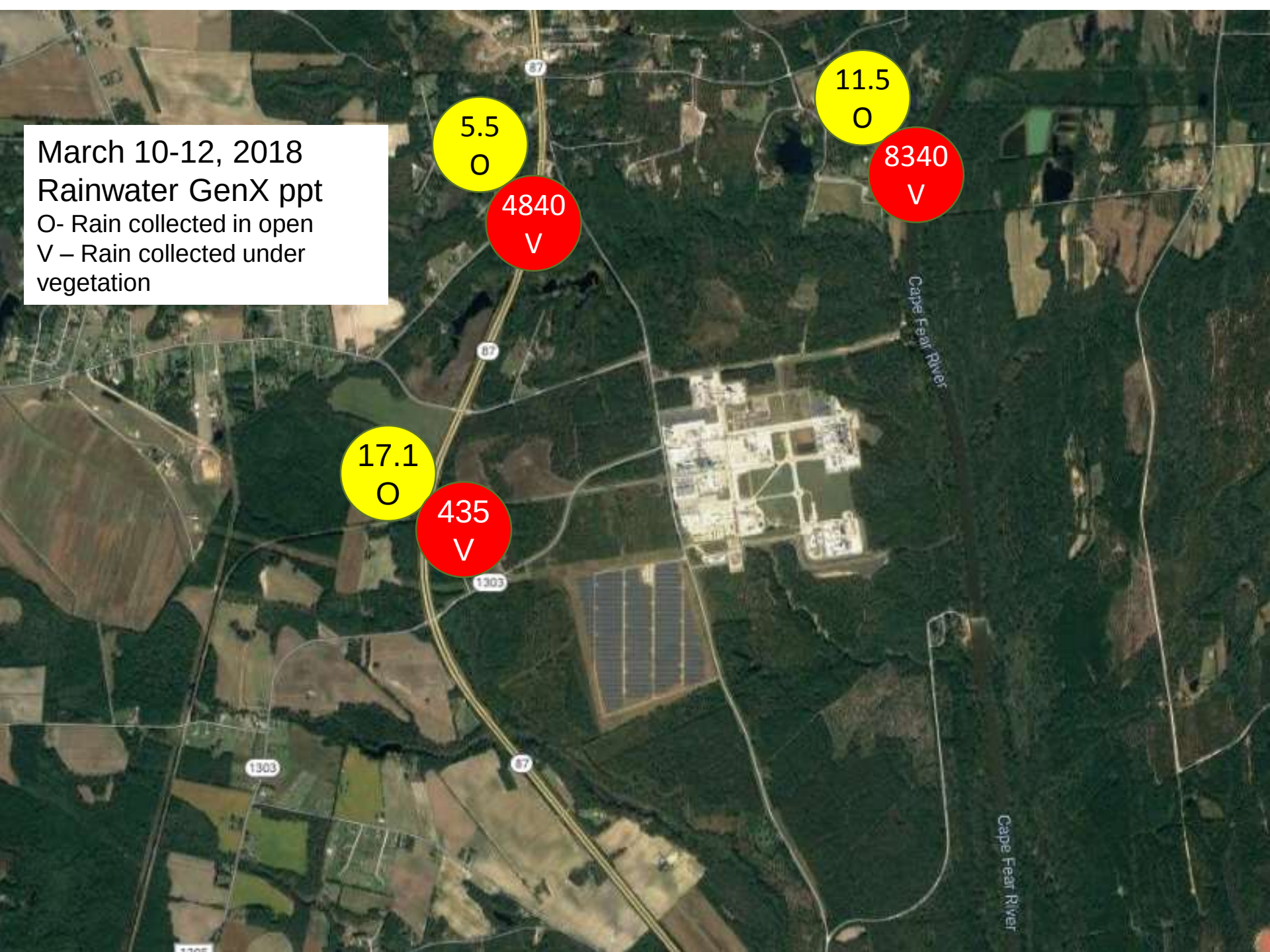
- Purchased temporary rain collection equipment.
- Used lab protocols to prepare equipment.
- Split the samples… sent to EPA for full PFAS analysis.

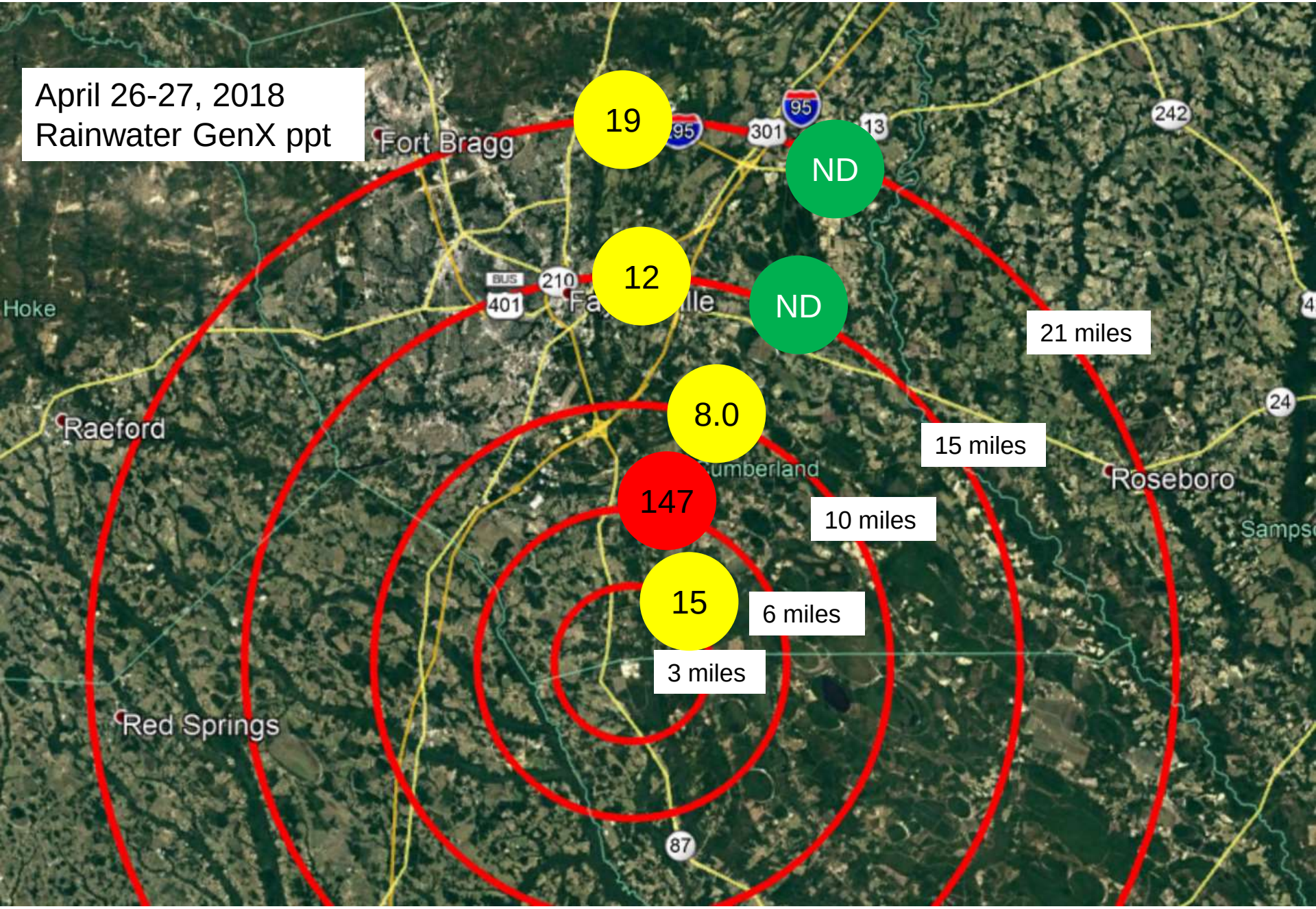

January 28-29, 2018
Rainwater GenX ppt
11.3
5.2
79.4
ND
39.4
ND
630
NS
93.2
Cape Fear River
Cape Fear River
87
1303


Integrated: 0400 UTC JAN 29 2018
to: 0600 UTC JAN 29 2018
> 1.0E-08 mass/m2
> 1.0E-09 mass/m2
> 1.0E-10 mass/m2
> 1.0E-11 mass/m2
Maximum: 4.4E-08 mass/m2
Minimum: 2.9E-18 mass/m2
NOAA
Cumberland
Big Island
St Pauls
Tar Heel
White Oak
© 2018 Google
Google earth
Imagery Date: 10/25/2016 34°49'57.73" N 78°50'25.34" W elev 146 ft eye alt 27.27 mi


16.9
9.98
18.3
76.4
28.1
14.5
February 4-5, 2018
Rainwater GenX ppt
58.1
286
59.2
40.9
87
1303
Cape Fear River
Cape Fear River


Feb 28 – March 2, 2018
Rainwater GenX ppt
45
60
56
NS
136
66
810
496
591
90
116
96
786
7 miles
5 miles
3 miles
Big Island
St Pauls
N 5th St
Cedar Creek Rd
71
95
20
242


March 10-12, 2018
Rainwater GenX ppt
O- Rain collected in open
V – Rain collected under vegetation
5.5
O
4840
V
11.5
O
8340
V
17.1
O
435
V
87
1303
Cape Fear River
Cape Fear River


April 26-27, 2018
Rainwater GenX ppt
19
ND
12
ND
8.0
147
15
21 miles
15 miles
10 miles
6 miles
3 miles
Fort Bragg
Raeford
Red Springs
Roseboro
Hoke
95
301
13
242
210
401
BUS
24
87

Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

- **GenX**
- **Wet deposition data - first of its kind**

- **7 separate rainfall catch and analysis**
  - **Near facility**
  - **Distance of 3, 5, 7 miles**
  - **Distance up to 20 miles**
  - **Rainfall and vegetation throughfall**

Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

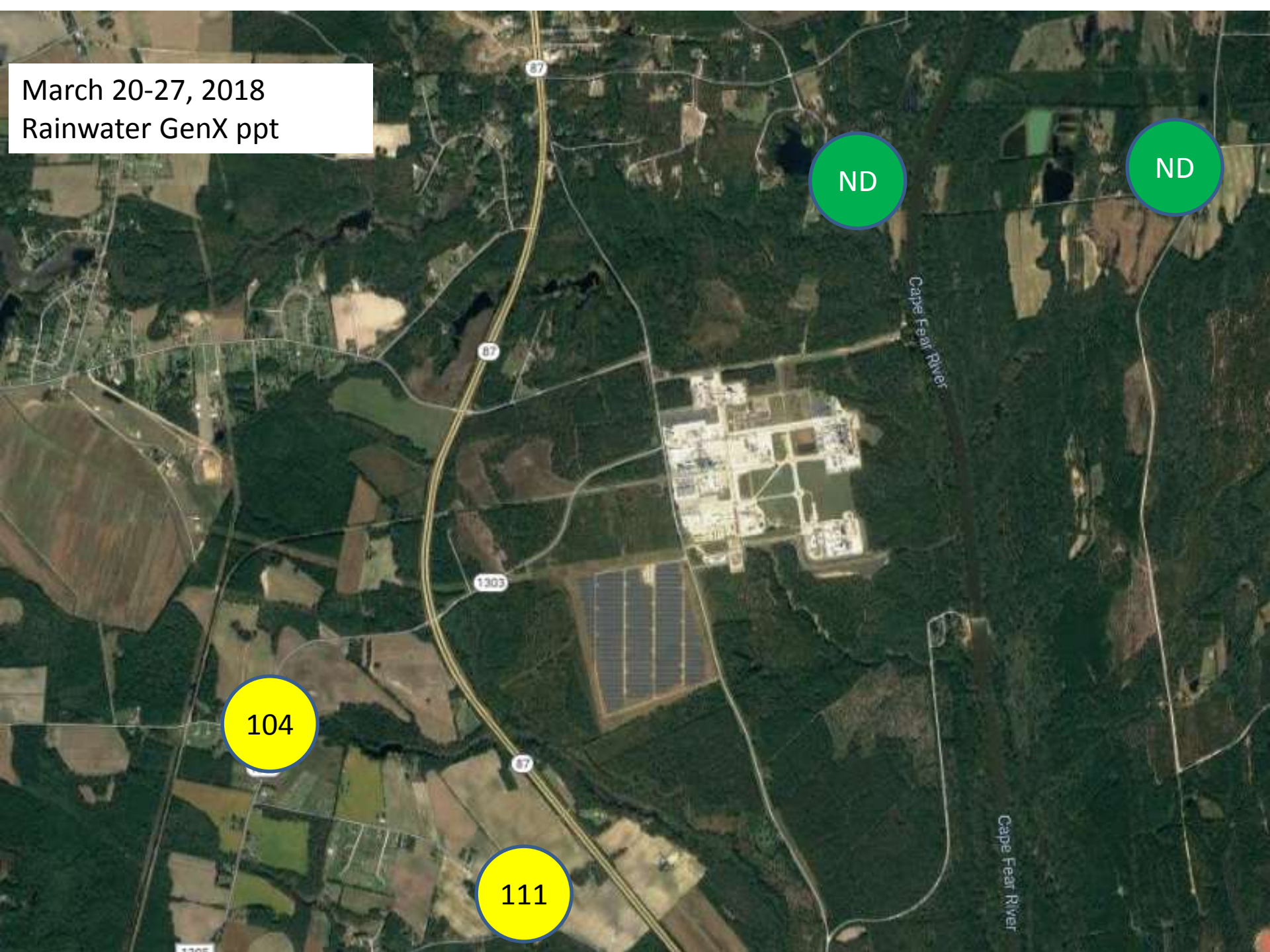
Ambient Air Quality Monitoring

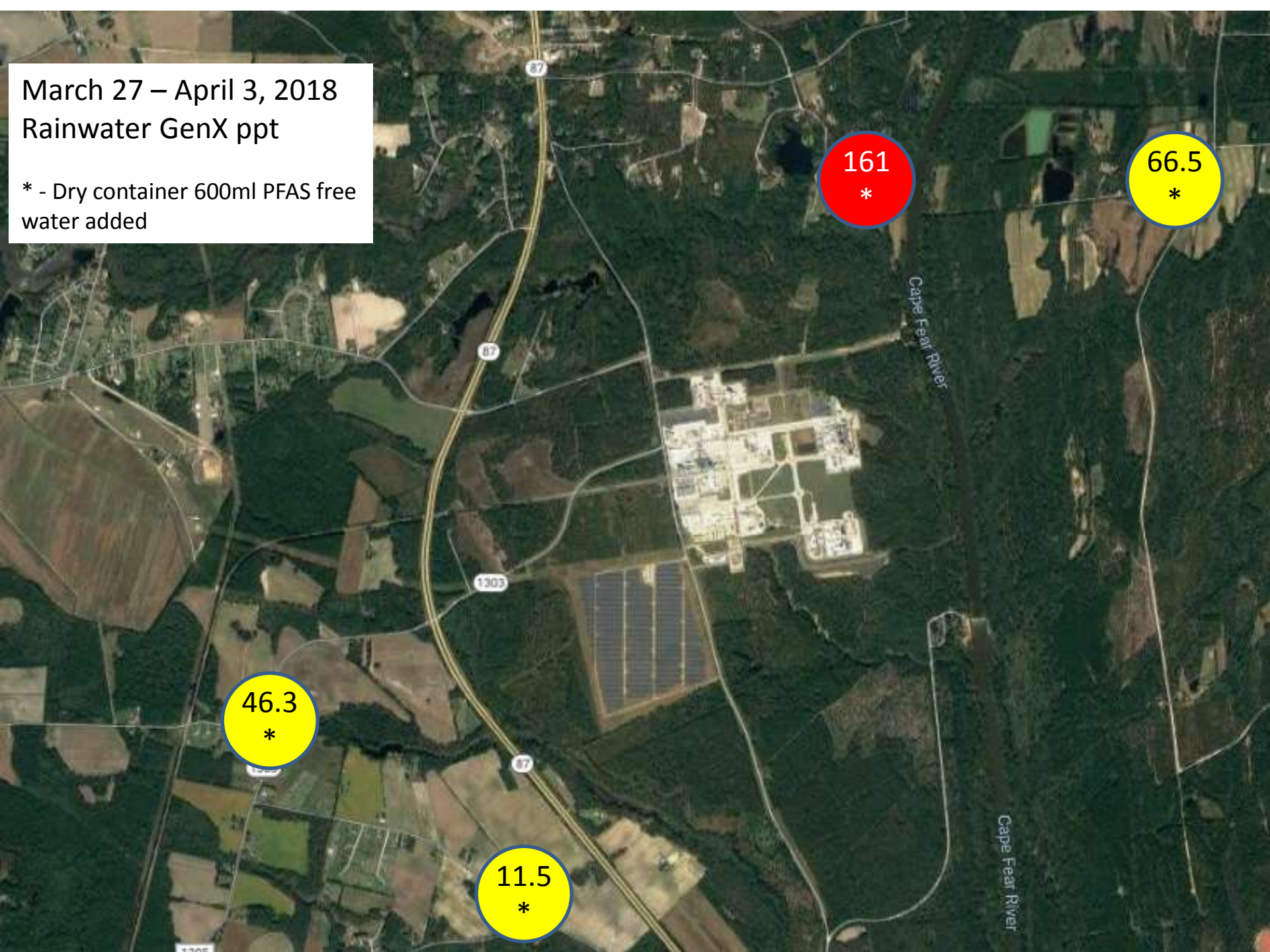
- Network of wet deposition monitors deployed.

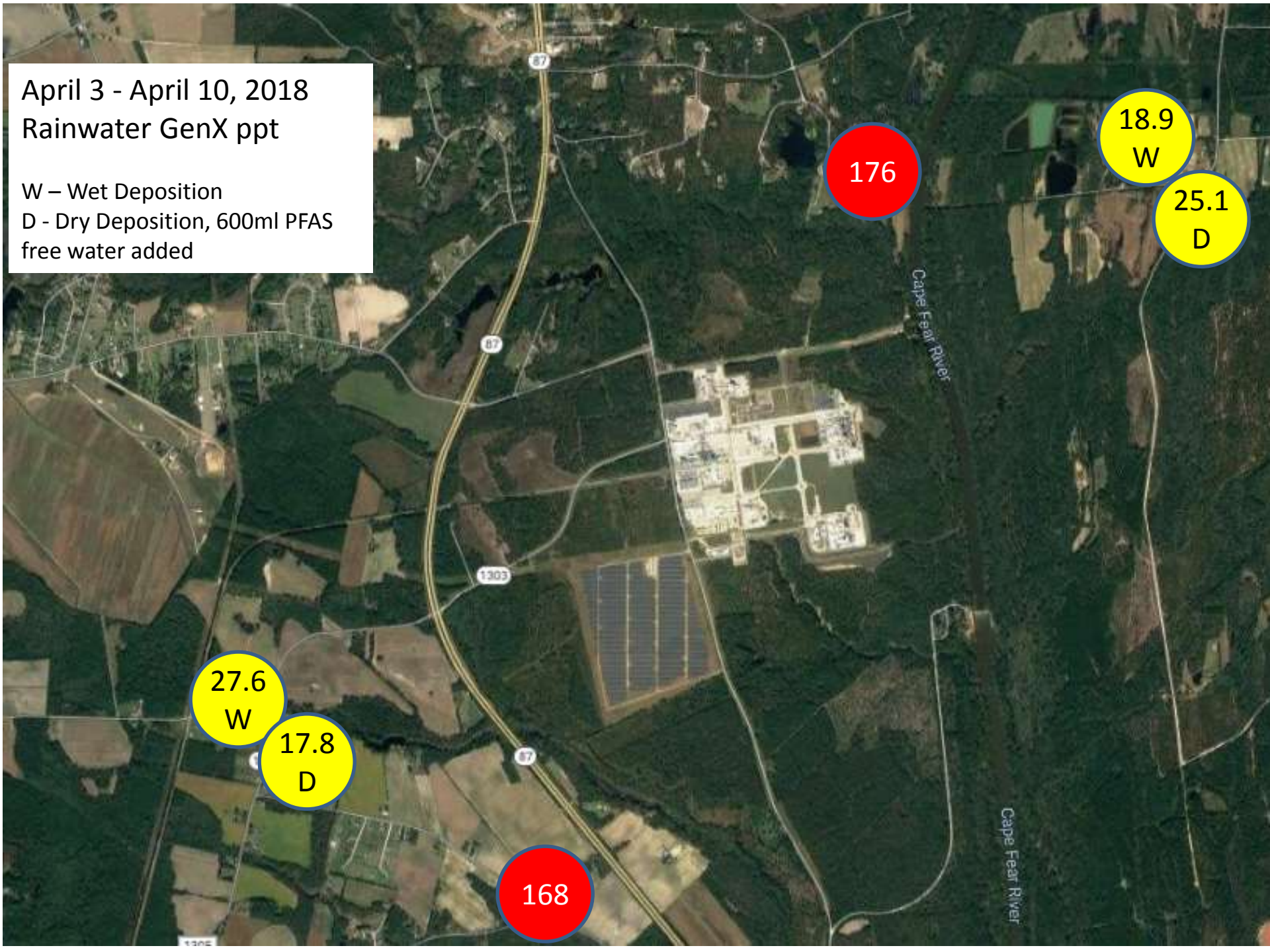
- Goal: Capture and analyze rainwater for genX / PFAS deposition
- Nearfield - Monitor for reductions as facility controls are implemented
- Background - Quantify "background" amounts of PFAS in rainwater.

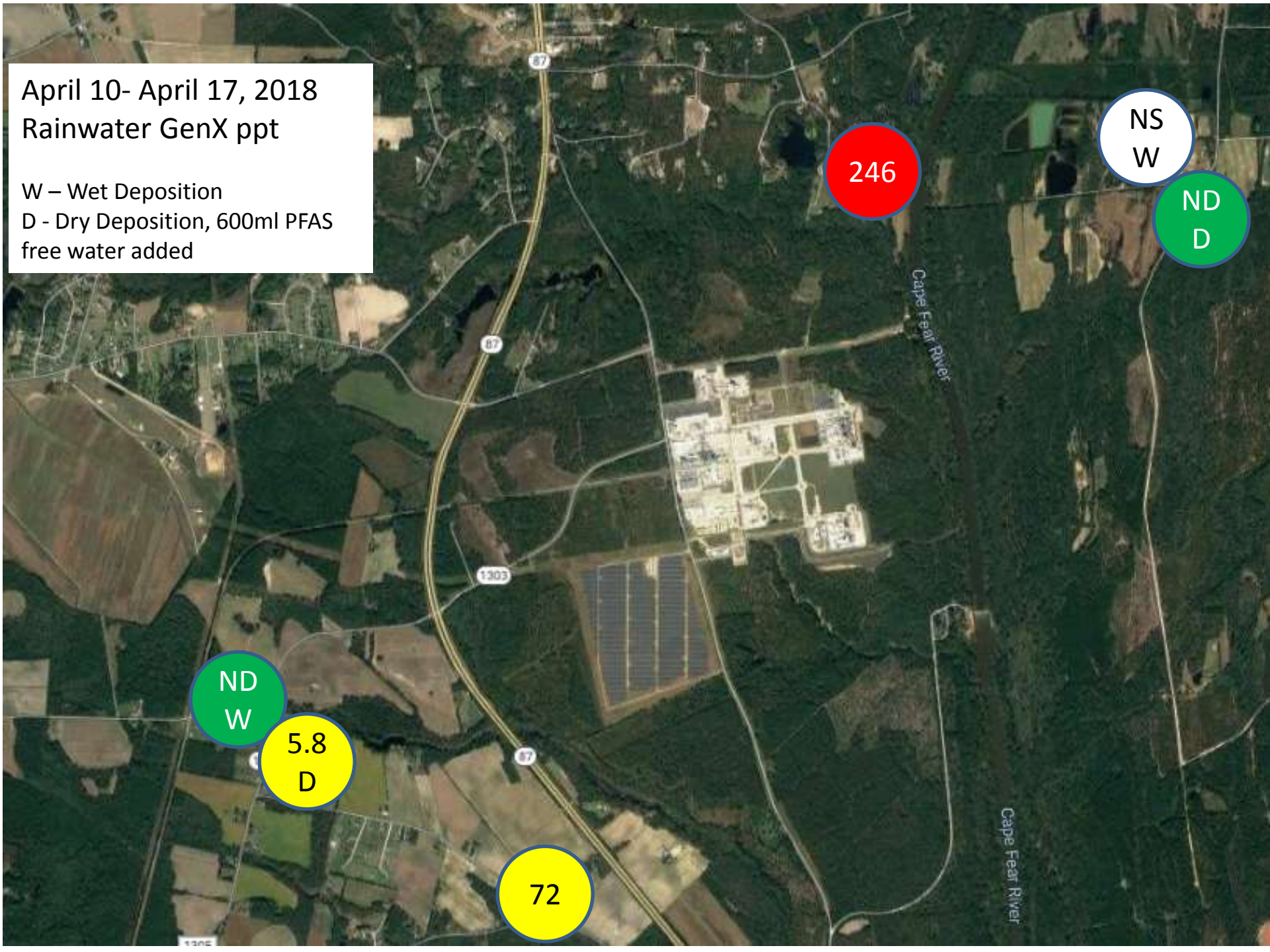
  - Source-oriented sites near Chemours
    - 2 northeast of facility
    - 2 southwest of facility
    - 1 west of the facility

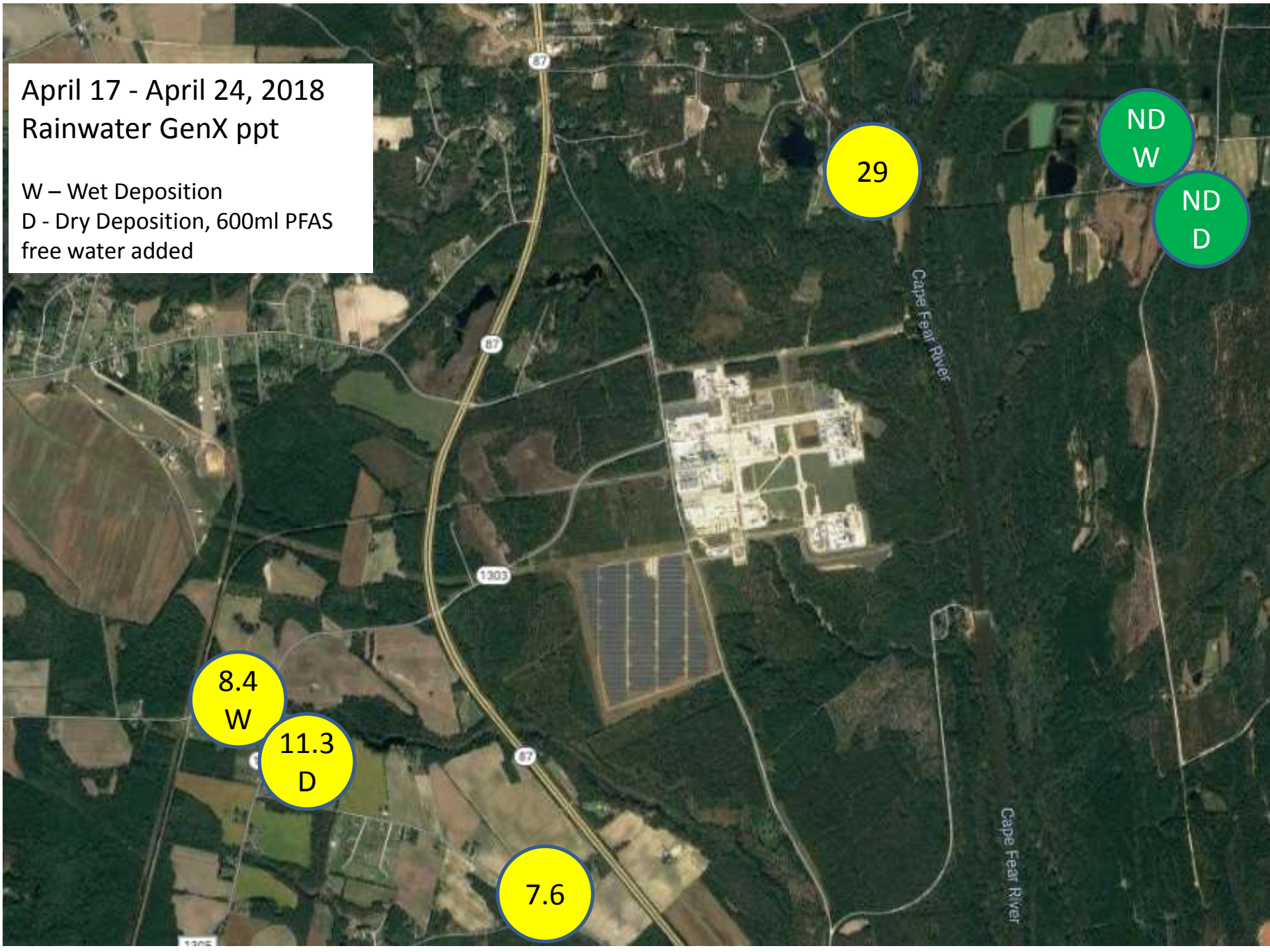
  - Background sites
    - Asheville
    - Raleigh
    - Candor
    - Wilmington

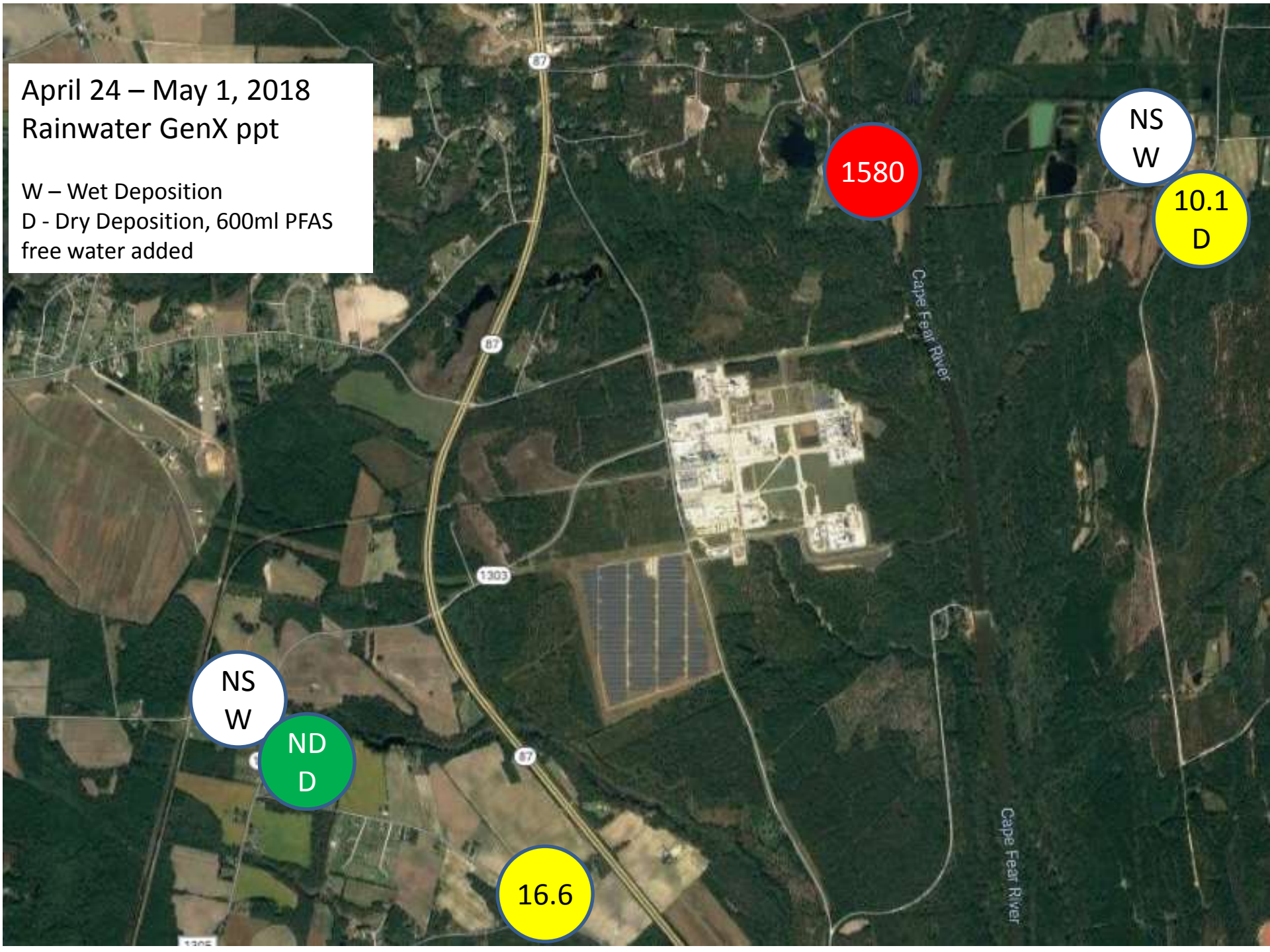

March 20-27, 2018
Rainwater GenX ppt
ND
ND
104
111
Cape Fear River
Cape Fear River
87
87
87
1303

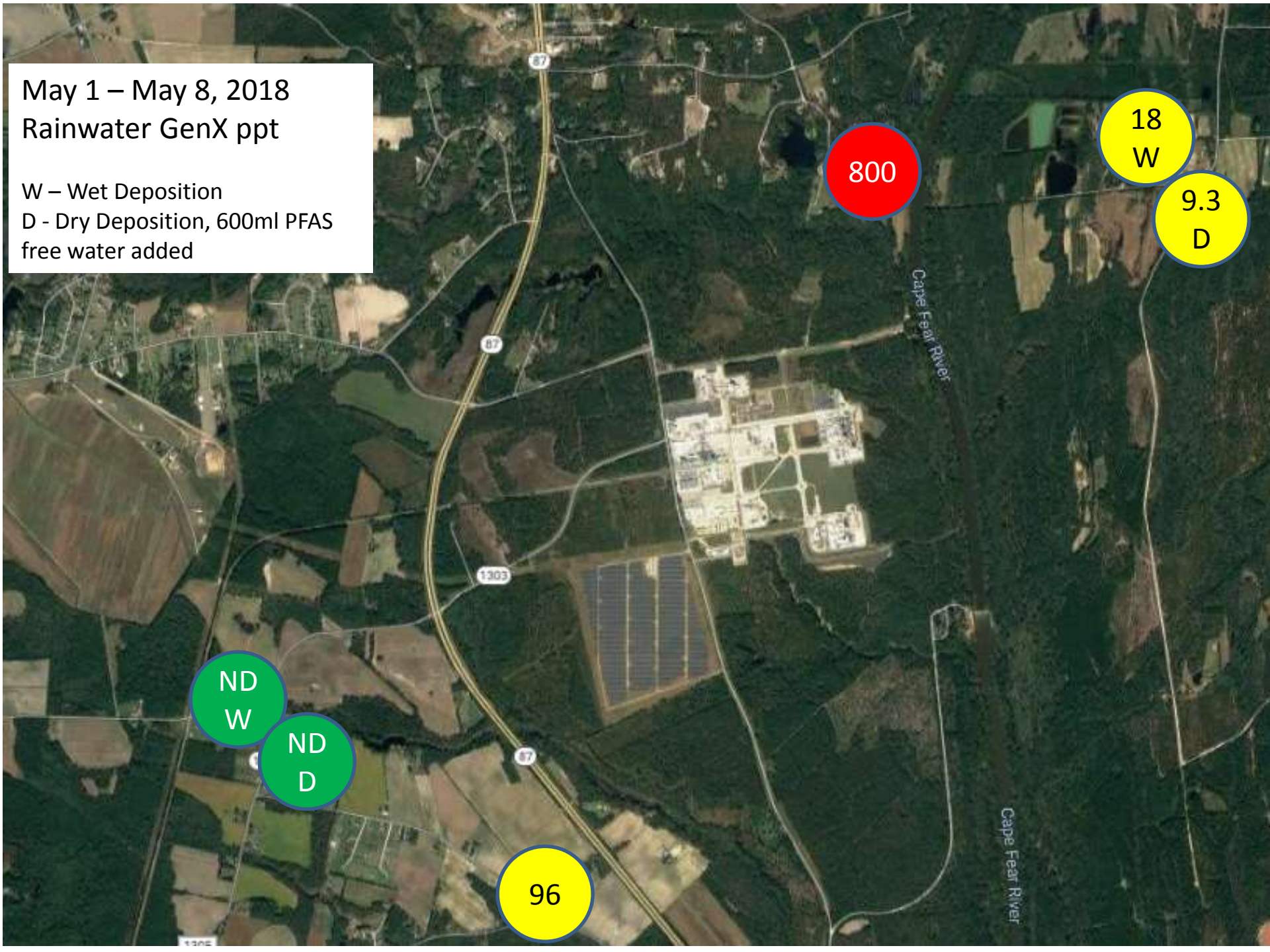

March 27 – April 3, 2018
Rainwater GenX ppt
* - Dry container 600ml PFAS free water added
161
*
66.5
*
46.3
*
11.5
*
Cape Fear River
Cape Fear River
87
87
87
1303

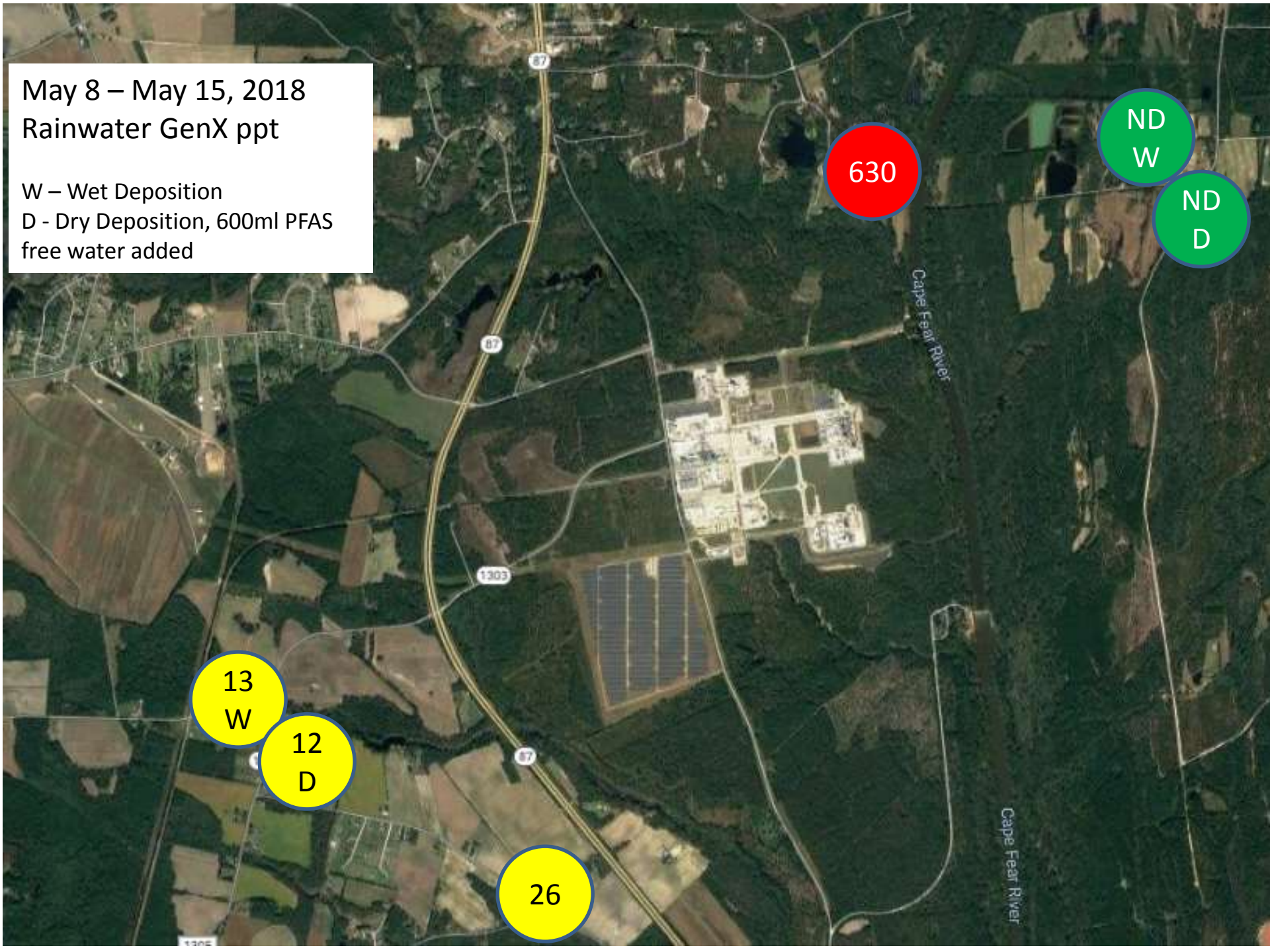

April 3 - April 10, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
176
18.9 W
25.1 D
27.6 W
17.8 D
168
Cape Fear River
Cape Fear River
87
87
87
1303

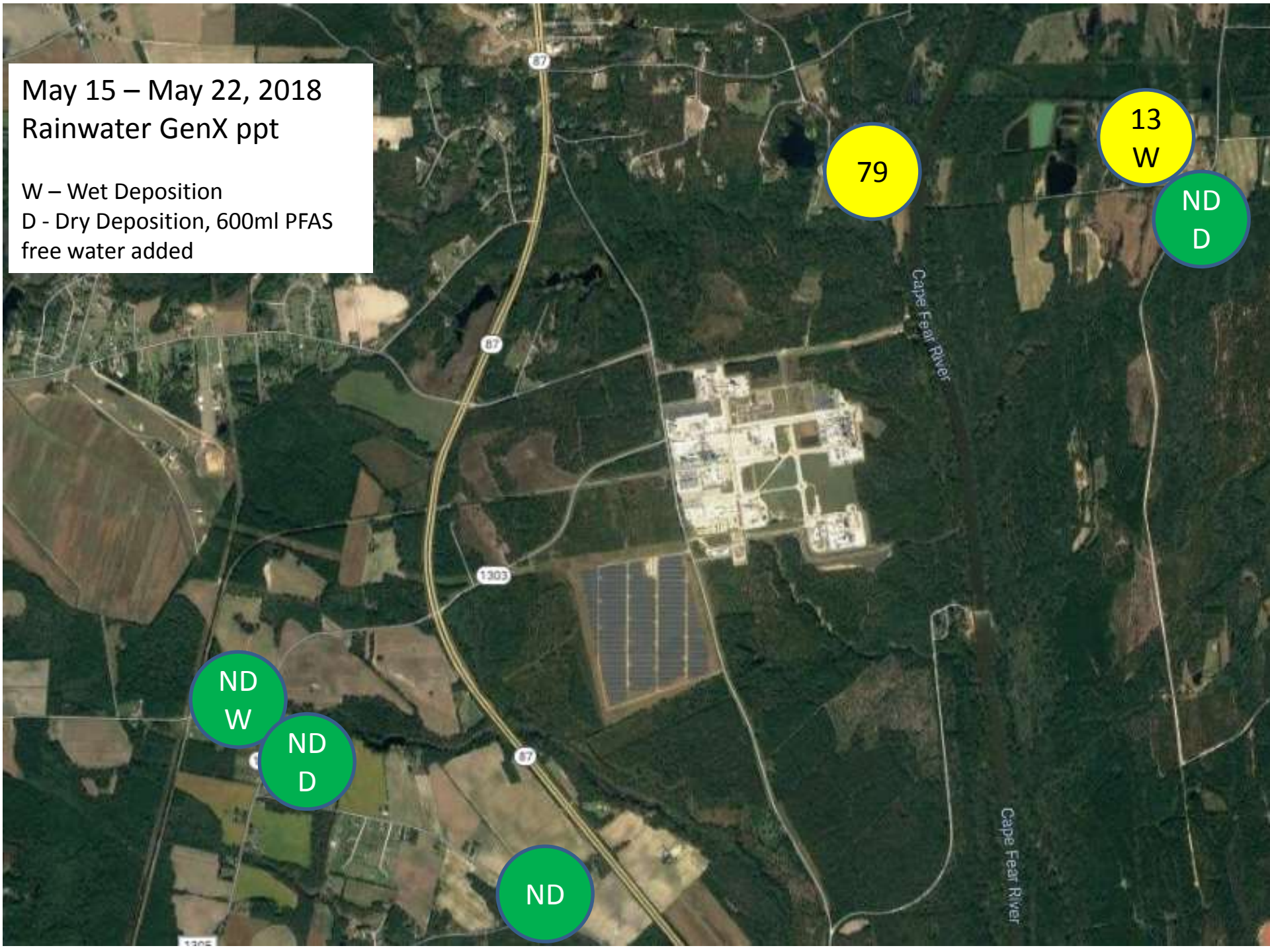

April 10- April 17, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
246
NS
W
ND
D
ND
W
5.8
D
72
Cape Fear River
Cape Fear River
87
1303

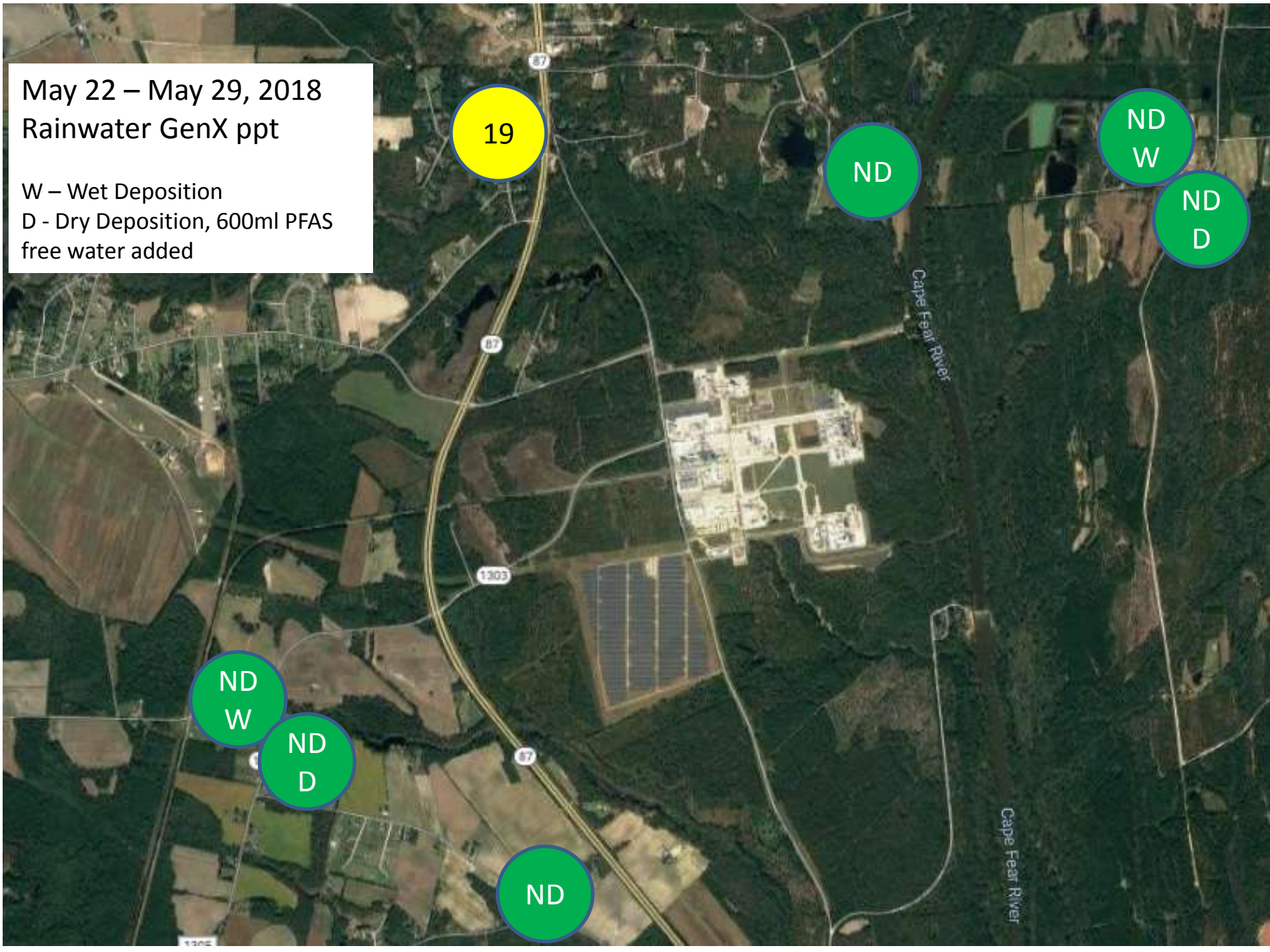

April 17 - April 24, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
29
ND W
ND D
8.4 W
11.3 D
7.6
Cape Fear River
Cape Fear River
87
87
87
1303

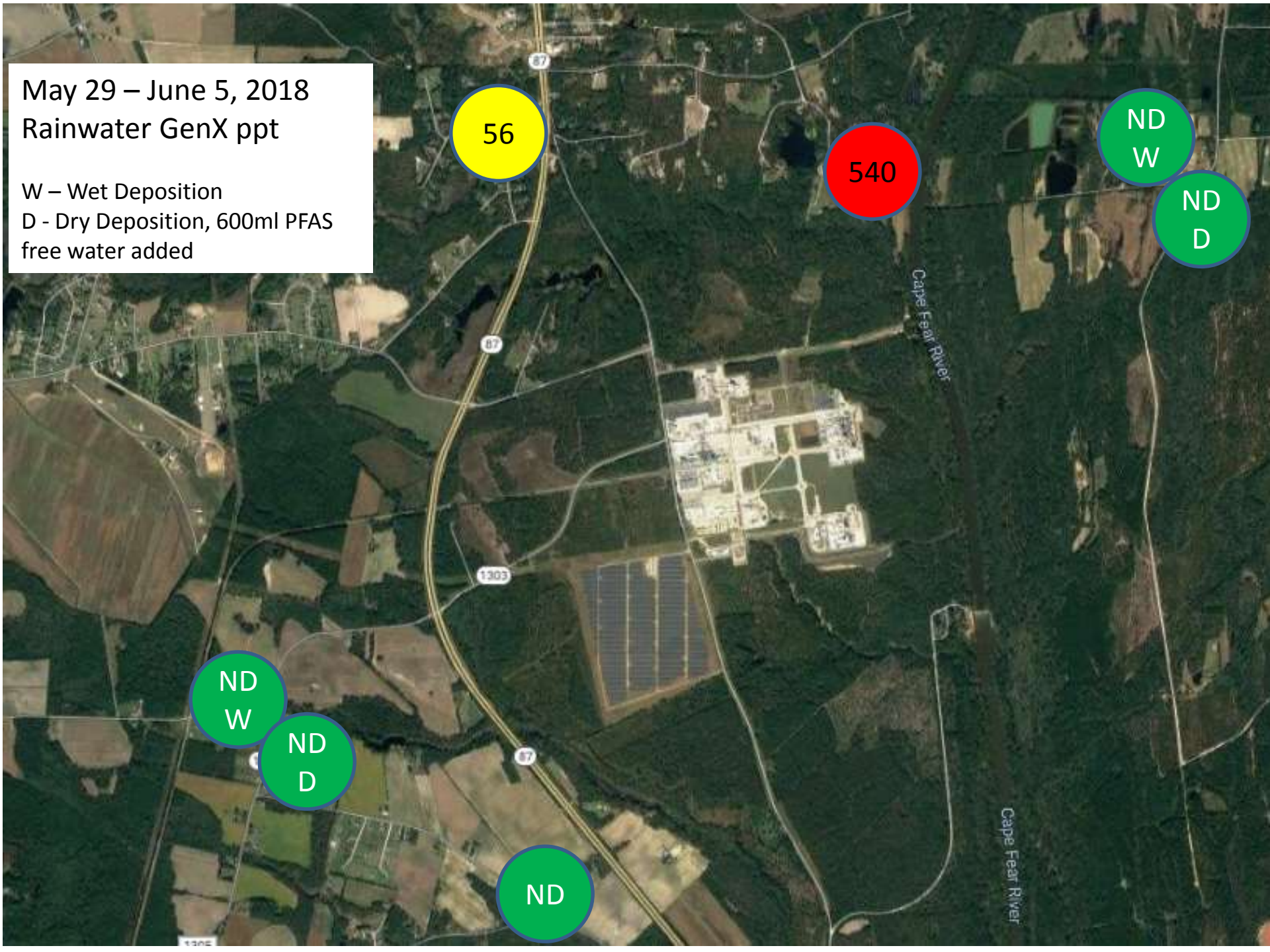

April 24 – May 1, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
1580
NS
W
10.1
D
NS
W
ND
D
16.6
Cape Fear River
Cape Fear River
87
87
87
1303

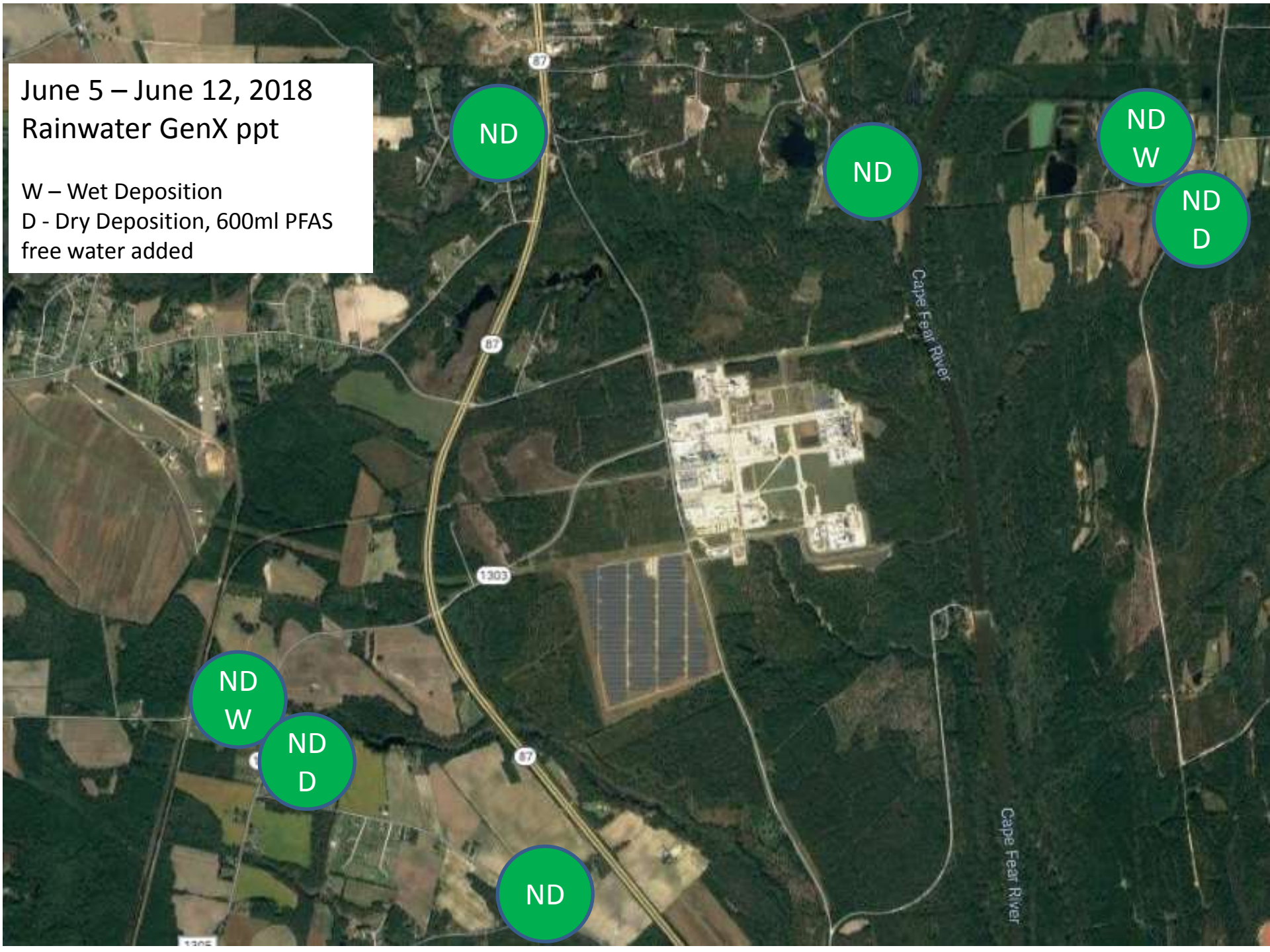

May 1 – May 8, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
800
18
W
9.3
D
ND
W
ND
D
96
Cape Fear River
Cape Fear River
87
87
87
1303


May 8 – May 15, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
630
ND W
ND D
13 W
12 D
26
Cape Fear River
Cape Fear River
87
1303


May 15 – May 22, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
79
13
W
ND
D
ND
W
ND
D
ND
Cape Fear River
Cape Fear River
87
87
87
1303


May 22 – May 29, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
19
ND
ND W
ND D
ND W
ND D
ND
87
1303
Cape Fear River
Cape Fear River


May 29 – June 5, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
56
540
ND W
ND D
ND W
ND D
ND
87
1303
Cape Fear River
Cape Fear River


June 5 – June 12, 2018
Rainwater GenX ppt
W – Wet Deposition
D - Dry Deposition, 600ml PFAS free water added
ND
ND
ND W
ND D
ND W
ND D
ND
87
87
87
1303
Cape Fear River
Cape Fear River

Emerging Compounds

Future:

- Control technologies. Move quickly.
  - How can we eliminate or significantly reduce the compounds of concern?
  - Understanding secondary impacts of adding air pollution controls to reduce PFAS.
    - Solid waste generated?
    - Waste water generated?
    - Secondary air pollutants generate
- Method development – other PFAS
- Learning from others - States and Countries
- Atmospheric fate?

Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

Summary of facts:

- The measured air emissions of GenX compounds are significantly higher than previously understood and reported.
- DAQ has measured GenX deposition through rainfall 20 miles from the facility.
- The evidence of atmospheric deposition of GenX shows a geographic footprint that is similar to the detection of GenX in groundwater samples.

Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

- **Health impacts – what are the inhalation risks?**
  - **North Carolina Secretaries' Science Advisory Board (DEQ & DHHS)**
- **Controls – what's technically feasible?**
  - **Carbon Adsorber trial approved**

Emerging Compounds

GenX - Recent Actions

April 6, 2018:

- **60 day notice of intent to modify Chemours' air permit:**
  - **Requires demonstration that emissions of GenX compounds do not or will not cause or contribute to violations of groundwater rules.**

The science and data collected to date informed this action.

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GenX - Recent Actions

April 9, 2018:

- **Amended complaint and motion for preliminary injunctive relief.**
- **Addresses the air emissions contributions to the groundwater violations.**

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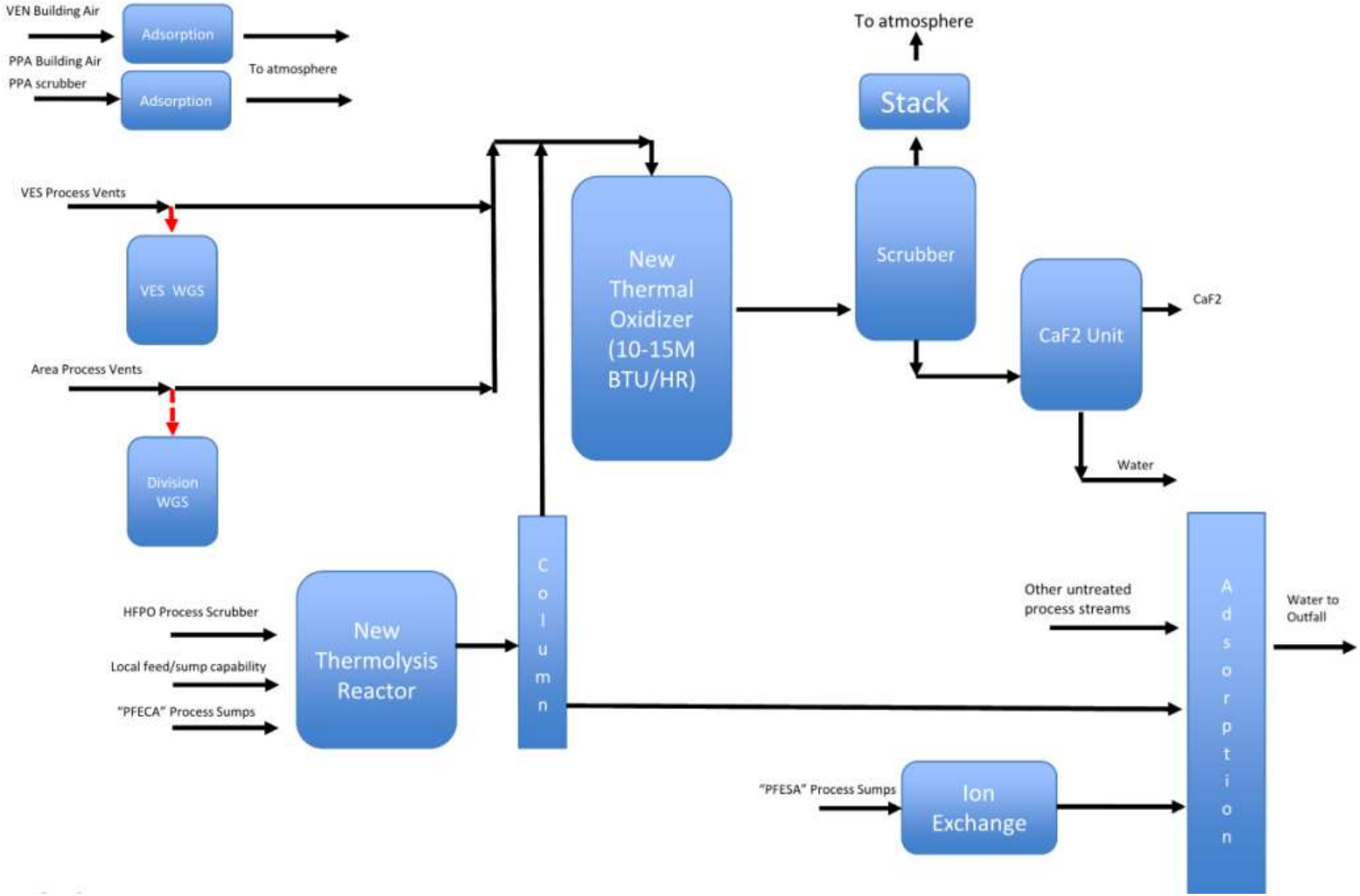
GenX - Recent Actions

April 27, 2018:

- **Chemours response to 60 day notice**
  - **Chemours committed to:**
  - **Install & operate a Regenerative Thermal Oxidizer by 2020**
    - **Expected 99% reduction of GenX emissions**


VEN Building Air
Adsorption
PPA Building Air
PPA scrubber
Adsorption
To atmosphere
To atmosphere
Stack
VES Process Vents
VES WGS
New Thermal Oxidizer (10-15M BTU/HR)
Scrubber
CaF2 Unit
CaF2
Area Process Vents
Division WGS
Water
HFPO Process Scrubber
Local feed/sump capability
"PFECA" Process Sumps
New Thermolysis Reactor
Column
Other untreated process streams
Adsorption
Water to Outfall
"PFESA" Process Sumps
Ion Exchange

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GenX - Recent Actions

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GenX - Recent Actions

June 11, 2018:

- **DEQ proposed a court order to require reductions of air emissions due to groundwater impacts**
- **30 day comment period ends 7/11/18**
- **Reduce facility-wide air emissions of GenX compounds by at least 97% by August 31, 2018 with a 99% reduction by December 31, 2019**

Contacts

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